

## IN-LINE ROLLER SKATE

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention:

[0001] The present invention relates to an in-line roller skate having at least one wheel that is recessed into the outsole of the skate, and more particularly, to an in-line roller skate having a reduced center of gravity.

#### 2. Description of the Related Art:

[0002] To achieve greater performance from in-line roller skates, skate designers and manufacturers continue to search for designs and manufacturing techniques to improve the handling, maneuverability, support, comfort, speed and durability which a skate can offer.

[0003] Maneuverability and speed continue to be two important design factors. The intended use of a particular skate drives the design. For example, maneuverability and speed are a major design factor for art, hockey and recreational in-line roller skates. Clearly speed would be the major factor in a speed skate design. Depending upon the use of the skate numerous skate designs have been introduced to improve maneuverability and speed for users.

[0004] The use of different sized wheels, where the smaller wheels are positioned beneath the heel or toe of the skate and the larger wheels beneath the heel, is known to provide greater maneuverability and lower height. British Patent No. 1,555,623 discloses a single track roller skate having front rollers which are of a smaller diameter than the rear rollers allowing the user to execute maneuvers of small and large arcs.

[0005] Moreover, it is known to provide a skate having a rear wheel of a larger diameter ensures improved stability as disclosed in U.S. Patent No. 5,046,746. Large wheels decrease rolling resistance but at the cost of elevating the foot and increasing foot strain to balance on the higher foot platform.

[0006] However, the skates of the prior art must use different sized wheels to achieve greater stability and/or maneuverability. This increases production costs and complicates wheel replacement.

[0007] Thus, there is a need for an in-line roller skate which ensures high maneuverability and/or stability.

## SUMMARY OF THE INVENTION

[0008] It is an object of the invention to provide an in-line roller skate having a lower center of gravity to improve maneuverability and stability.

[0009] It is another object of the present invention to provide an in-line roller skate having a plurality of wheels and a reduced foot elevation to provide a lower center of gravity and reduce turning movement for the user.

[0010] According to these and other objects of the present invention there is provided an in-line roller skate comprising a boot for receiving the foot of a user, the boot including a heel portion, a toe portion and a bottom portion. An outsole is disposed along the bottom portion of the boot. A chassis including a pair of elongated, parallel frames is attached to the bottom portion of the skate. A recess is disposed in the outsole of the boot. A plurality of wheels are mounted on the chassis, wherein at least one of the plurality of wheels is partially recessed within the recess of the outsole.

[0011] These and other objects, features, aspects, and advantages of the present invention will become more apparent from the following detailed description of the preferred embodiment relative to the accompanied drawings, in which:

## BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Fig. 1 is a perspective view of an in-line roller skate according to the present invention.

[0013] Fig. 2 is a bottom view of the outsole of the in-line roller skate of Fig. 1.

[0014] Fig. 3 is a front view of the in-line roller skate of Fig. 1.

[0015] Fig. 4 is an enlarged bottom view of the front portion of the in-line roller skate of Fig. 1.

[0016] Fig. 5 is a side view of the chassis of one embodiment of the in-line roller skate of the present invention.

[0017] Fig. 6 is a top view of the chassis of Fig. 5.

[0018] Fig. 7 is a top view of a chassis according to another embodiment of the present

invention.

[0019] Fig. 8 is a bottom view of an outsole of another embodiment of an in-line roller skate according to the present invention.

[0020] Fig. 9 is a bottom view of an outsole of a third embodiment of an in-line roller skate according to the present invention.

[0021] Fig. 10 is a side view of an in-line roller skate according to another embodiment of the present invention.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0022] Referring to Fig. 1, an in-line roller skate 10 according to the present invention includes a boot 12 for receiving the foot of a user. Boot 12 includes a heel portion 9 and a toe portion 11. A bottom portion 13 of the boot has an outer peripheral shape corresponding to the shape of the user's foot. Toe portion 11 and heel portion 9 are spaced longitudinally along bottom portion 13 by an appropriate distance to accommodate a particular user's foot.

[0023] The boot further includes an upper portion to form a cavity for receiving the user's foot. Laces further secure the user's foot within the boot. Although laces are illustrated it should be appreciated that other securing means, for example, buckles, straps, etc., could be used to secure the user's foot within the boot.

[0024] Adhered to bottom portion 13 of boot 12 is an outsole 20. As shown in Fig. 2, outsole 20 includes a heel section 22 and a toe section 24. Outsole 20 can be made of a carbon-glass weave or other suitable material. Outsole 20 can be attached to boot 12 via conventional means such as screws, rivets or adhesive. Outsole 20 further includes a heel cup 23, as shown in Fig. 1, to cradle the heel portion 9 of the boot.

[0025] Referring again to Fig. 2, outsole 20 includes an elongated recess 30 disposed at the toe section. Recess 30 extends along the longitudinal axis of the outsole and is approximately 3 to 5 mm deep. As will be discussed further herein, a portion of at least the first or second wheel of the skate extends upwardly into recess 30 reducing the center of gravity of the skate, reducing ankle-turning torque and allowing the skater more pushing power while simultaneously reducing fatigue.

[0026] As shown in Figs. 3 and 4, an upper portion 17 of the wheel extends into recess 30 by an amount (d). Depth (d) can be less than or equal to 5 mm.

[0027] In the embodiment of Figs. 1-4, the first wheel 16a and the second wheel 16b both extend into recess 30. Thus, recess 30 should have a length long enough to accommodate both wheels. The length of recess 30 depends upon the actual size of the boot. Ultimately, however, the length of the recess should not be more than half the length of the boot. Moreover, the recess should have a width ample enough to accommodate the particular sized wheel so that the wheel can freely rotate within the recess.

[0028] Referring back to Fig. 1, the in-line roller skate according to one embodiment includes four wheels 16a, 16b, 16c and 16d rotatably mounted on a chassis 14 in a manner known in the art. The wheels are disposed in an in-line arrangement with wheel 16a being the first wheel disposed at the toe portion of the skate and wheel 16d being the fourth or last wheel disposed beneath the skate's heel. As will be discussed further herein, in one embodiment all four wheels 16a-d have the same size diameter. The wheel size ultimately depends upon the user. For example, an adult sized skate would use larger diameter wheels than a juvenile sized skate. For an adult sized skates each of the wheels could be 80mm or more in diameter. It should be appreciated that other sized wheels could be used, and the present invention should not be limited to a particular sized wheel. For example, a large rear wheel and three equal sized smaller wheels could be used, wherein at least one of the first or second wheels are recessed.

[0029] As shown in Fig. 3, chassis 14 includes a pair of parallel frames 14a and 14b. Each frame includes a front bracket 15a, 15b and a rear bracket 17a, 17b. Chassis 14 is a one piece system having a plurality of recesses for reduced weight. Appropriate materials for the frame could be Al; Ti; Mg; injected molded plastic, such as nylon; or a glass/carbon/polyaramid composite.

[0030] Referring to Fig. 5, bracket 15 disposed at the toe portion of the skate is disposed below bracket 17. However, due to the provision of recess 30, the wheels can be mounted on the chassis with the axles of the wheels being equi-distanced from the skating surface, see Fig. 1. Frames 14a and 14b are mounted to outsole 20 via a plurality of fasteners as is known in the art. Referring to Figs. 3 and 4, frames 14a and 14b are mounted so as to extend along each side of the recess 30.

[0031] Referring to Fig. 6, the chassis of the first embodiment of the present invention includes frames 14a and 14b. Frames 14a and 14b includes portions 15a and 15b at a first respective end. Frames 14a and 14b are completely open at the front of the frame and separated by a distance large enough to accommodate recess 30. At the second end of frames 14a and 14b is bracket 17.

[0032] A second embodiment of a chassis is shown in Fig. 7 and includes frames 14a' and 14b'. Front bracket 15' is closed at one end of the frames. Bracket 15' includes an aperture 19 which is positioned to correspond to recess 30 in the outsole. Cut-outs 21 can also be provided in bracket 15' to accommodate additional recessed wheels.

[0033] Referring to Fig. 8, according to another embodiment of the present invention, a recess 30' is arranged and sized to accommodate only the first wheel of the skate.

[0034] Fig. 9 illustrates an outsole according to still another embodiment of the present invention. In this particular embodiment, recess 30" is positioned and sized to accommodate only the second wheel. Accordingly, the first, third and fourth wheels are not recessed within the recess.

[0035] Fig. 10 illustrates an in-line roller skate having five wheels, a design suited for speed skating. As shown, the second and third wheels, 16b and 16c, respectively, can be recessed within the recess as in the embodiment of Fig. 1.

[0036] Although the present invention has been described in relation to particular embodiments thereof, many other variations and modifications and other uses will become apparent to those skilled in the art. It is preferred therefore, that the present invention be limited not by the specific disclosure herein, but only by the appended claims.